

CLAIMS

What is claimed is:

1. A field effect transistor, comprising:
 2. a channel;
 3. an undercut area under the channel;
 4. a gate electrode disposed over the channel; and
 5. a compressive film in the undercut area, wherein the compressive thin film creates longitudinal stress in an area of the channel under the gate electrode.
1. 2. The transistor of claim 1 wherein the transistor is a PFET, and an upper portion of the channel is under longitudinal compressive stress.
1. 2. 3. The transistor of claim 1 wherein the transistor is a NFET, and an upper portion of the channel is under longitudinal tensile stress.
1. 2. 4. The transistor of claim 1, wherein the transistor is a PFET, and the undercut area is disposed under an end of the channel.
1. 2. 5. The transistor of claim 1, wherein the transistor is a NFET, and the undercut area is disposed under a middle portion of the channel.
1. 2. 6. The transistor of claim 1 wherein the transistor is a PFET, and the transistor comprises an undercut area under a source, and an undercut area under a drain.
1. 2. 3. 7. The transistor of claim 1 wherein the compressive film is made of a material selected from the group consisting of oxidized polysilicon, oxidized amorphous silicon, silicon nitride, oxidized SiGe, and thermal silicon dioxide.

1 8. A method for making a field effect transistor with a current channel with
2 longitudinal stress, comprising the steps of:
3 a) forming an undercut area under the channel; and
4 b) forming a compressive film in the undercut area so that longitudinal stress
5 is created in the channel.

1 9. The method of claim 8 wherein the undercut area is located at an end of the
2 channel.

1 10. The method of claim 8 wherein the undercut area is located under a middle
2 portion of the channel.

1 11. The method of claim 10 wherein the channel is released in the middle portion.

1 12. The method of claim 8 wherein the undercut area is created by etching a buried
2 oxide layer from under the channel.

1 13. The method of claim 8 wherein the compressive film is formed by depositing
2 polysilicon and then oxidizing the polysilicon.

1 14. A field effect transistor, comprising:
2 a) a buried oxide layer;
3 b) a channel disposed on the buried oxide layer;
4 c) an undercut area under the channel;
5 d) a gate electrode disposed over the channel; and
6 e) a compressive film in the undercut area, wherein the compressive thin film
7 creates longitudinal stress in an area of the channel under the gate
8 electrode.

1 15. The transistor of claim 14 wherein the undercut area is an area of etched buried
2 oxide material.